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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/975,985	10/15/2001	Kim B. Roberts	9-13528-152us	9596

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EXAMINER	
CURS, NATHAN M	
ART UNIT	**PAPER NUMBER**
2613	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/975,985	ROBERTS ET AL.	
	Examiner	Art Unit	
	Nathan Curs	2613	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-24 and 26-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-5,8-14,17,19-24,26-28,30-34 and 37* is/are rejected.

7)☒ Claim(s) *6,7,15,16,18,29,35,36 and 38* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. Figure 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 3-5, 8-14, 17, 19-24, 26-28, 30-34 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergano et al. ("Bergano") (US Patent Application Publication No. 2002/0149823) in view of Admitted Prior Art ("APA") (specification fig. 2 and paragraphs 0036 and 0038).

Regarding claim 1, Bergano discloses a method of measuring a polarization dependent loss/gain (PDL) in an optical communications system including a plurality of optical components, the method comprising: receiving an optical signal at a selected detection point of the optical communications system (figs. 4 and 5 and paragraphs 0035-0040 and 0044), the optical signal

having been launched into the optical communications system with a predetermined initial polarization state (figs. 1 and 2 and paragraphs 0026 and 0043); detecting a PDL-dependent result for the signal and evaluating the PDL using the predetermined initial polarization state and the detected PDL-dependent result (paragraphs 0037-0039, 0043, 0044 and 0046). Bergano discloses that PDL in the system will cause the transmit signal transmitted through the system with the predetermined initial polarization state to possess amplitude modulation at the receive end between the orthogonal P1 and P2 polarization states that were alternatively square-wave modulated at the transmit side (paragraph 0033), but discloses detecting the PDL-dependent result at the receiver using amplitude detection that does not distinguish the received polarization state. APA discloses measuring the received power of each beam of a pair of beams having respective orthogonal polarization directions to determine a polarization state (fig. 2 and paragraph 0036). It would have been obvious to one of ordinary skill in the art at the time of the invention to measure the received powers of the received P1 and P2 polarization components of the signal of Bergano, based on the teaching of APA, in order to evaluate the PDL using the predetermined initial polarization state and the detected polarization state, as suggested by Bergano's disclosure of the effect of PDL on the polarization state of a transmitted signal.

Regarding claim 3; the combination of Bergano and APA discloses a method as claimed in claim 1, wherein the optical signal comprises any one of: a data signal; a test signal; and an Amplified Spontaneous Emission (ASE) signal (Bergano: paragraphs 0025 and 0029)

Regarding claim 4, the combination of Bergano and APA discloses a method as claimed in claim 1, wherein the predetermined initial polarization state is substantially time-invariant (Bergano: paragraph 0043).

Regarding claim 5, the combination of Bergano and APA disclose a method as claimed in claim 4, wherein the predetermined initial polarization state comprises a degree of polarization of the optical signal launched into the optical transmission system (Bergano: paragraph 0026 and 0043, where a predefined "state of polarization" inherently has a "degree of polarization").

Regarding claim 8, the combination of Bergano and APA discloses a method as claimed in claim 4, wherein the predetermined initial polarization state comprises respective known initial power levels of orthogonally polarized signal components multiplexed into the optical signal (Bergano: paragraphs 0026 and 0043).

Regarding claim 9, the combination of Bergano and APA discloses a method as claimed in claim 8, wherein the step of detecting the polarization state of the signal comprises a step of detecting respective power levels of each of the orthogonally polarized signal components (Bergano: paragraph 0033 and APA: fig. 2 and paragraph 0036, as applicable in the combination).

Regarding claim 10, the combination of Bergano, APA and Marro discloses a method as claimed in claim 9, but the combination as described for claim 9 does not disclose that the detector detecting the respective power levels comprising: de-multiplexing each of the orthogonally polarized signal components from the optical signal; and measuring respective eye openings of each of the de-multiplexed signal components. However, APA also discloses that polarization de-multiplexing the orthogonal signal components of a received signal and measuring the eye openings of each component is conventional for determining the polarization state (specification, paragraph 0038). It would have been obvious to one of ordinary skill in the art at the time of the invention that the eye openings of the demultiplexed orthogonal signal components could be measured to determine the levels of the orthogonal signal components

that define the detected polarization state, in order to evaluate the PDL using the predetermined initial polarization state and the detected polarization state, as suggested by Bergano's disclosure of the effect of PDL on the polarization state of a transmitted signal.

Regarding claim 11, the combination of Bergano and APA discloses a method as claimed in claim 1, and discloses determining the detected polarization state for comparison to the initial polarization state to evaluate PDL, but does not explicitly disclose a step of calculating a vector difference between the detected polarization state and the initial polarization state. However, APA discloses that representing a polarization state as a vector quantity, based on the levels of the orthogonally polarized signal components, is conventional (specification, paragraph 0036). It would have been obvious to one of ordinary skill in the art at the time of the invention to represent the disclosed polarization states of Bergano as a vectors, and comparing polarization states by calculating a vector difference, in order to evaluate the PDL using the predetermined initial polarization state and the detected polarization state, as suggested by Bergano's disclosure of the effect of PDL on the polarization state of a transmitted signal.

Regarding claim 12, the combination of Bergano and APA discloses a method as claimed in claim 1, wherein the predetermined initial polarization state comprises a predetermined variation of a polarization vector of the optical signal (Bergano: paragraph 0026).

Regarding claim 13, the combination of Bergano and APA discloses a method as claimed in claim 12, wherein the predetermined variation of the polarization vector comprises a rotation of the polarization vector in accordance with a predetermined dither pattern (Bergano: paragraph 0026).

Regarding claim 14, the combination of Bergano and APA discloses a method as claimed in claim 13, wherein the predetermined dither pattern comprises either one or both of: a

step-wise rotation of the polarization vector between orthogonal directions; and a small-scale perturbation of a polarization angle of the polarization vector (Bergano: paragraph 0026).

Regarding claim 17, the combination of Bergano and APA discloses a method as claimed in claim 12, wherein the predetermined variation of the polarization vector comprises variation of respective power levels of orthogonally polarized signal components multiplexed into the optical signal, in accordance with respective orthogonal dither patterns (Bergano: paragraph 0026).

Regarding claim 19, Bergano discloses a system for measuring a polarization dependent loss/gain (PDL) in an optical communications system including a plurality of cascaded optical components, the system comprising: a transmitter adapted to launch an optical signal having a predetermined initial polarization state into the optical communications system (figs. 1 and 2 and paragraphs 0026 and 0043); a detector adapted to detect a PDL-dependent result of the signal at a selected detection point (paragraphs 0037-0039, 0043, 0044 and 0046); and a processor adapted to evaluate the PDL using the predetermined initial polarization state and the detected PDL-dependent result (paragraphs 0043, 0044 and 0046). Bergano discloses that PDL in the system will cause the transmit signal transmitted through the system with the predetermined initial polarization state to possess amplitude modulation at the receive end between the orthogonal P1 and P2 polarization states that were alternatively square-wave modulated at the transmit side (paragraph 0033), but discloses detecting the PDL-dependent result at the receiver using amplitude detection instead of a polarization state detector adapted to detect a polarization state of the signal. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine APA with Bergano as described above for claim 1.

Regarding claim 20, the combination of Bergano and APA discloses a system as claimed in claim 19, wherein the transmitter comprises a polarization rotator adapted to selectively rotate a polarization vector of the optical signal (Bergano: paragraph 0026).

Regarding claim 21, the combination of Bergano and APA discloses a system as claimed in claim 19, wherein the transmitter comprises a controller adapted to selectively vary respective power levels of orthogonal signal components multiplexed into the optical signal, in accordance with respective orthogonal dither patterns (Bergano: paragraph 0026).

Regarding claim 22, the combination of Bergano and APA discloses a system as claimed in claim 19, wherein the detector comprises: a beam splitter adapted to split the optical signal into respective orthogonally polarized beams; and means for detecting respective power levels of each of the orthogonally polarized beams (APA: fig. 2 and paragraph 0036, as applicable in the combination).

Regarding claim 23, the combination of Bergano and APA discloses a system and network element as claimed in claim 19, and discloses de-multiplexing each of the orthogonally polarized signal components from the optical signal (APA: fig. 2 and paragraph 0036, as applicable in the combination), but the combination as described for claim 19 does not disclose measuring respective eye openings of each of the de-multiplexed signal components. However, APA discloses that polarization de-multiplexing the orthogonal signal components of a received signal and measuring the eye openings of each component is conventional for determining the polarization state (specification, paragraph 0038). It would have been obvious to one of ordinary skill in the art at the time of the invention that the eye openings of the demultiplexed orthogonal signal components could be measured to determine the levels of the orthogonal signal components that define the detected polarization state, in order to evaluate the PDL using the predetermined initial polarization state and the detected polarization state, as

suggested by Bergano's disclosure of the effect of PDL on the polarization state of a transmitted signal.

Regarding claim 24, Bergano discloses a network element for measuring a polarization dependent loss/gain (PDL) in an optical communications system including a plurality of optical components, the network element comprising: a receiver adapted to receive an optical signal at a selected detection point of the optical communications system (figs. 4 and 5 and paragraphs 0035-0040 and 0044), the optical signal having been launched into the optical communications system with a predetermined initial polarization state (figs. 1 and 2 and paragraphs 0026 and 0043); a detector adapted to detect a PDL-dependent result in the signal (paragraphs 0037-0039, 0043, 0044 and 0046); and a processor adapted to evaluate the PDL using the predetermined initial polarization state and the PDL-dependent result (paragraphs 0043, 0044 and 0046). Bergano discloses that PDL in the system will cause the transmit signal transmitted through the system with the predetermined initial polarization state to possess amplitude modulation at the receive end between the orthogonal P1 and P2 polarization states that were alternatively square-wave modulated at the transmit side (paragraph 0033), but discloses detecting the PDL-dependent result at the receiver using amplitude detection instead of a polarization state detector adapted to detect a polarization state of the signal. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine APA with Bergano as described above for claim 1.

Regarding claim 26, the combination of Bergano and APA discloses a network element as claimed in claim 24, wherein the optical signal comprises any one of: a data signal; a test signal; and an Amplified Spontaneous Emission (ASE) signal (Bergano: paragraphs 0025 and 0029).

Regarding claim 27, the combination of Bergano and APA discloses a network element as claimed in claim 24, wherein the predetermined initial polarization state is substantially time-invariant (Bergano: paragraph 0043).

Regarding claim 28, the combination of Bergano and APA discloses a network element as claimed in claim 27, wherein the predetermined initial polarization state comprises a degree of polarization of the optical signal launched into the optical transmission system (Bergano: paragraph 0026 and 0043, where a predefined "state of polarization" inherently has a "degree of polarization").

Regarding claim 30, the combination of Bergano and APA discloses a network element as claimed in claim 27, wherein the predetermined initial polarization state comprises respective known initial power levels of orthogonally polarized signal components multiplexed into the optical signal (Bergano: paragraphs 0026 and 0043).

Regarding claim 31, the combination of Bergano and APA discloses a system and network element as claimed in claim 30, and discloses de-multiplexing each of the orthogonally polarized signal components from the optical signal (APA: fig. 2 and paragraph 0036, as applicable in the combination), but the combination as described for claim 30 does not disclose measuring respective eye openings of each of the de-multiplexed signal components. However, APA discloses that polarization de-multiplexing the orthogonal signal components of a received signal and measuring the eye openings of each component is conventional for determining the polarization state (specification, paragraph 0038). It would have been obvious to one of ordinary skill in the art at the time of the invention that the eye openings of the demultiplexed orthogonal signal components could be measured to determine the levels of the orthogonal signal components that define the detected polarization state, in order to evaluate the PDL using the predetermined initial polarization state and the detected polarization state, as

suggested by Bergano's disclosure of the effect of PDL on the polarization state of a transmitted signal.

Regarding claim 32, the combination of Bergano and APA discloses a network element as claimed in claim 24, wherein the predetermined initial polarization state comprises a predetermined variation of a polarization vector of the optical signal (Bergano: paragraph 0026).

Regarding claim 33, the combination of Bergano and APA discloses a network element as claimed in claim 32, wherein the predetermined variation of the polarization vector comprises a rotation of the polarization vector in accordance with a predetermined dither pattern (Bergano: paragraph 0026).

Regarding claim 34, the combination of Bergano and APA discloses a network element as claimed in claim 33, wherein the predetermined dither pattern comprises either one or both of: a step-wise rotation of the polarization vector between orthogonal directions; and a small-scale perturbation of a polarization angle of the polarization vector (Bergano: paragraph 0026).

Regarding claim 37, the combination of Bergano and APA discloses a network element as claimed in claim 32, wherein the predetermined variation of the polarization vector comprises variation of respective power levels of orthogonally polarized signal components multiplexed into the optical signal, in accordance with respective orthogonal dither patterns (Bergano: paragraph 0026).

Allowable Subject Matter

4. Claims 6, 7, 15, 16, 18, 29, 35, 36 and 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

5. Applicant's arguments filed 1 December 2006 have been fully considered but they are not persuasive.

Regarding the objection to the drawings, the applicant's arguments acknowledge that the method of splitting the received signal into orthogonal polarization and then measuring the power level of each polarization is known, consistent with paragraph 0036 of the specification. However, the applicant argues that the fig. 2 combination of a beam splitter, a pair of photodiodes and multiplier element 30 is not known. This argument is not persuasive because the applicant, in addressing the rejections under 35 USC § 103(a), subsequently states that "PDL detector 18", which includes multiplier element 30, is prior art.

The applicant also argues that the rejections under 35 USC § 103(a) are not proper because the Bergano reference provides "no teaching or suggestion" of any alternative to determining PDL from modulation amplitude of the received signal. This argument is not persuasive because the combination of the rejections is not based on Bergano explicitly teaching an alternative method for determining PDL, nor is this required. However, when the combined teachings are considered, Bergano does implicitly suggest that the alternative presented by the admitted prior art can be used, by way of his disclosure of the effect of PDL on polarization state. MPEP § 2143.01 states "The teaching, suggestion, or motivation must be found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. 'The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art.'" Bergano describes the effect of PDL on the polarization state of a transmitted signal, and also discloses determining PDL at the receiver as conceded by the applicant. The admitted prior art discloses

a PDL detector at a receiver that measures the polarization components of the received signal. Considering the teachings together, Bergano's teaching would have suggested to one of ordinary skill in the art that the teaching of the admitted prior art is an alternative for determining PDL.

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

7. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Any inquiry of

a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pairdirect.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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